AMENDMENTS TO THE CLAIMS

Claims 1-11 (Cancelled).

12. (Currently Amended) A vibration meter for measuring a viscosity of a fluid flowing through a pipe, which vibration meter comprises:

a transducer assembly

with at least one flow tube being inserted into the pipe, said flow tube having a lumen conducting the fluid and said flow tube being clamped at an inlet end and an outlet end so as to be capable of vibrating,

with an electromechanical excitation arrangement acting on said at least one flow tube, said excitation arrangement driving said flow tube to oscillate in a bending mode and in a torsional mode simultaneously with said bending mode oscillations ~~for producing viscous friction within the fluid, and~~

with a sensor arrangement responsive to ~~oscillations~~ lateral oscillating deflections of the flow tube, for generating at least one sensor signal, representative of oscillations of the flow tube; and

meter electronics

with an excitation circuit which generates an excitation current feeding the excitation arrangement, and

with an evaluating circuit which derives from said at least one sensor signal and from the excitation current a viscosity value representative of the viscosity of the fluid.

13. (Previously Presented) The vibration meter as claimed in claim 12, wherein the evaluating circuit derives from the at least one sensor signal a density value representative of a density of the fluid and wherein the evaluating circuit also uses said density value for determining the viscosity value.

14. (Previously Presented) The vibration meter as claimed in claim 12, wherein the evaluating circuit derives from the at least one sensor signal a signal value representative of a lateral deflection of the flow tube and wherein the evaluating circuit uses said signal value representative of a lateral deflection of the flow tube for determining the viscosity value.

15. (Previously Presented) The vibration meter as claimed in claim 12, wherein the evaluating circuit determines a damping of said deflections of the flow tube by using the at least one sensor signal and the excitation current and wherein the evaluating circuit determines the viscosity value depending on said damping of the deflections of the flow tube.

16. (Previously Presented) The vibration meter as claimed in claim 12, wherein the evaluating circuit estimates a velocity of a motion of the fluid, said motion causing a viscous friction within said fluid, and wherein the evaluating circuit uses the at least one sensor signal for estimating said velocity.

17. (Previously Presented) The vibration meter as claimed in claim 16, wherein the evaluating circuit determines the viscosity value depending on said motion being estimated.

18. (Previously Presented) The vibration meter as claimed in claim 12, wherein the at least one sensor signal is a first sensor signal generated by said sensor arrangement and wherein the sensor arrangement generates a second sensor signal, one of said first and second sensor signals being representative of inlet-side deflections of said flow tube, the other one of said first and second sensor signals being representative of outlet-side deflections of said flow tube.

19. (Cancelled)

20. (Currently Amended) A vibration meter for measuring a viscosity of a fluid flowing through a pipe, which vibration meter comprises:

a transducer assembly

with at least one flow tube being inserted into the pipe, said flow tube having a lumen conducting the fluid and said flow tube being clamped at an inlet end and an outlet end so as to be capable of vibrating,

with an electromechanical excitation arrangement, said excitation arrangement driving said flow tube to oscillate in a bending mode at least partially for producing viscous friction within the fluid, and

with a sensor arrangement, responsive to oscillations of the flow tube, for generating at least one sensor signal, representative of lateral deflections of the flow tube; and

meter electronics

with an excitation circuit which generates an excitation current feeding the excitation arrangement, and

with an evaluating circuit which ~~derives~~ estimates from said at least one sensor signal and from the excitation current a damping of oscillations of said flow tube and which derives a viscosity value representative of the viscosity of the fluid based on said damping being estimated.

21. (Previously Presented) The vibration meter as claimed in claim 20, wherein the evaluating circuit derives from the at least one sensor signal a density value representative of a density of the fluid and wherein the evaluating circuit also uses said density value for determining the viscosity value.

22. (Previously Presented) The vibration meter as claimed in claim 20, wherein the evaluating circuit derives from the at least one sensor signal a signal value representative of a lateral deflection of the flow tube and wherein the evaluating circuit uses said signal value representative of a lateral deflection of the flow tube for determining the viscosity value.

23. (Previously Presented) The vibration meter as claimed in claim 20, wherein the evaluating circuit determines a damping of said deflections of the flow tube by using the at least one sensor signal and the excitation current and wherein the evaluating circuit determines the viscosity value depending on said damping of the deflections of the flow tube.

24. (Previously Presented) The vibration meter as claimed in claim 20, wherein the evaluating circuit estimates a velocity of a motion of the fluid, said motion causing a viscous friction within said fluid, and wherein the evaluating circuit uses the at least one sensor signal for estimating said velocity.

25. (Previously Presented) The vibration meter as claimed in claim 24, wherein the evaluating circuit determines the viscosity value depending on said motion being estimated.

26. (Previously Presented) The vibration meter as claimed in claim 20, wherein the at least one sensor signal is a first sensor signal generated by said sensor arrangement and wherein the sensor arrangement generates a second sensor signal being representative of outlet-side deflections of said flow tube.

27. (Previously Presented) The vibration meter as claimed in claim 20, wherein the excitation arrangement driving said flow tube to oscillate in a torsional

mode simultaneously with said bending mode oscillations.

28. (Previously Presented) A vibration meter for measuring a viscosity of a fluid flowing through a pipe, which vibration meter comprises:

a transducer assembly

with a single flow tube being inserted into the pipe, said flow tube having a lumen conducting the fluid and said flow tube being clamped at an inlet end and an outlet end so as to be capable of vibrating,

with an electromechanical excitation arrangement, said excitation arrangement driving said flow tube to oscillate in a bending mode at least partially, and

with a sensor arrangement including an electro-dynamic sensor, responsive to oscillations of the flow tube, for generating at least one sensor signal, representative of a velocity of lateral deflections of the flow tube; and

meter electronics

with an excitation circuit which generates an excitation current feeding the excitation arrangement, and

with an evaluating circuit which generates a viscosity value representative of the viscosity of the fluid,

wherein the evaluating circuit uses said at least one sensor signal for estimating a velocity of a motion of the fluid, said motion causing a viscous friction within the fluid, and

wherein the evaluating circuit determines the viscosity value depending on said motion being estimated and said excitation current.

29. (Previously Presented) The vibration meter as claimed in claim 28, wherein the evaluating circuit derives from the at least one sensor signal a density value representative of a density of the fluid and wherein the evaluating

circuit also uses said density value for determining the viscosity value.

30. (Previously Presented) The vibration meter as claimed in claim 28, wherein the evaluating circuit derives from the at least one sensor signal a signal value representative of a lateral deflection of the flow tube and wherein the evaluating circuit uses said signal value representative of a lateral deflection of the flow tube for determining the viscosity value.

31. (Previously Presented) The vibration meter as claimed in claim 28, wherein the evaluating circuit determines a damping of said deflections of the flow tube by using the at least one sensor signal and the excitation current and wherein the evaluating circuit determines the viscosity value depending on said damping of the deflections of the flow tube.

32. (Previously Presented) The vibration meter as claimed in claim 28, wherein the evaluating circuit estimates a velocity of a motion of the fluid, said motion causing a viscous friction within said fluid, and wherein the evaluating circuit uses the at least one sensor signal for estimating said velocity.

33. (Previously Presented) The vibration meter as claimed in claim 32, wherein the evaluating circuit determines the viscosity value depending on said motion being estimated.

34. (Previously Presented) The vibration meter as claimed in claim 28, wherein the at least one sensor signal is a first sensor signal generated by the sensor arrangement and wherein the sensor arrangement generates a second sensor signal being representative of outlet-side deflections of said flow tube.

35. (Previously Presented) The vibration meter as claimed in claim 28, wherein the excitation arrangement drives said flow tube to oscillate in a torsional mode simultaneously with said bending mode oscillations.

36. (Previously presented) A method of measuring a viscosity and a density of a fluid flowing through a pipe, said method comprising the steps of:

using an electromechanical excitation arrangement for driving a flow tube being inserted into the pipe and conducting said fluid, said flow tube being clamped to an inlet and an outlet end so as to be capable of vibrating and said excitation arrangement acting on said flow tube approximately midway between said inlet end and said outlet end;

feeding said excitation arrangement by an oscillating excitation current and driving said flow tube to vibrate in a bending mode at least partially, said bending mode vibrations causing lateral deflections of said flow tube and said bending mode vibrations producing viscous friction within said fluid;

sensing oscillations of said flow tube by using a sensor arrangement being responsive to lateral oscillations of the flow tube and generating at least one sensor signal being representative of lateral oscillations of the flow tube;

using said at least one sensor signal and said excitation current to determine a viscosity value representative of said viscosity to be measured, and

using said at least one sensor signal to determine a density value representative of said density to be measured.

37. (Previously Presented) The method as claimed in claim 36, wherein the step of determining the viscosity value comprises the step of determining from the at least one sensor signal and from the excitation current a damping of deflections of the flow tube.

Claim 38 (Cancelled).

39. (Previously Presented) The method as claimed in claim 37, wherein the step of determining the damping of deflections of the flow tube comprises the steps of:

generating an estimate representative of a velocity of a motion of the fluid, said motion causing said viscous friction within the fluid; and

dividing the friction value by said estimate to obtain a quotient value depending on the damping of deflections of the flow tube.

40. (Previously Presented) The method as claimed in claim 36, wherein the step of determining the viscosity value comprises the step of estimating from the at least one sensor signal a velocity of a motion of the fluid, said motion causing said viscous friction within the fluid.

41. (Previously Presented) The method as claimed in claim 37, wherein the step of determining the damping of deflections of the flow tube comprises the step of obtaining from the excitation current a friction value representative of said viscous friction.

42. (Previously Presented) The method as claimed in claim 41, wherein the step of determining the damping of deflections of the flow tube comprises the steps of:

generating an estimate representative of the estimated motion of the fluid; and

dividing the friction value by said estimate to obtain a quotient value depending on the damping of deflections of the flow tube.

43. (Previously Presented) The method as claimed in claim 36, wherein the step of determining the viscosity value further comprises a step of using said density value for determining said viscosity to be measured.

44. (Previously presented) A method of measuring a viscosity and a density of a fluid flowing through a pipe, said method comprising the steps of:

using an electromechanical excitation arrangement for driving a flow tube being inserted into the pipe and conducting said fluid;

feeding said excitation arrangement by an oscillating excitation current and driving said flow tube to vibrate in a bending mode at least partially, said bending mode vibrations causing lateral deflections of said flow tube and said bending mode vibrations producing viscous friction within said fluid;

sensing oscillations of said flow tube by using a sensor arrangement being responsive to lateral oscillations of the flow tube and generating at least one sensor signal being representative of lateral oscillations of the flow tube;

using said at least one sensor signal and said excitation current to determine a viscosit value representative of said viscosit to be measured and

using said at least one sensor signal to determine a density value representative of said density to be measured;

wherein the step of determining the viscosity value further comprises a step of using said density value for determining said viscosity to be measured; and

wherein the step of determining the viscosity value comprises the step of deriving from the density value and the excitation frequency value a correction value depending on the density of the fluid and the excitation frequency.

45. (Previously Presented) The method as claimed in claim 44, wherein the step of determining the viscosity value comprises the step of correcting the determined damping of deflections of the flow tube by using the correction value.

46. (Previously Presented) The method as claimed in claim 43, wherein the step of determining the density of the fluid comprises the step of deriving the density value from said at least one sensor signal.

47. (Previously Presented) The method as claimed in claim 36, wherein the excitation current has an excitation frequency corresponding to a mechanical resonance frequency of the flow tube.

48. (Previously Presented) The method as claimed in claim 47, wherein the step of determining the viscosity value comprises the step of generating an excitation frequency value representative of said excitation frequency.

49. (Currently Amended) A method of measuring a viscosity and a density of a fluid flowing through a pipe said method comprising the steps of:

using an electromechanical excitation arrangement for driving a flow tube being inserted into the pipe and conducting said fluid;

feeding said excitation arrangement by an oscillating excitation current and driving said flow tube to vibrate in a bending mode at least partially, said bending mode vibrations causing lateral deflections of said flow tube and said bending mode vibrations producing viscous friction within said fluid;

sensing oscillations of said flow tube by using a sensor arrangement being responsive to lateral oscillations of the flow tube and generating at least one sensor signal being representative of lateral oscillations of the flow tube;

using said at least one sensor signal and said excitation current to determine a viscosity value representative of said viscosity to be measured, and

using said at least one sensor signal to determine a density value representative of said density to be measured;

wherein the excitation current has an excitation frequency corresponding

to a mechanical resonance frequency of the flow tube;

wherein the step of determining the viscosity value comprises the step of generating an excitation frequency value representative of said excitation frequency; and

wherein the step of determining the viscosity value comprises the step of deriving from the density value and the excitation frequency value a correction value depending on the density of the fluid and the excitation frequency.

50. (Previously Presented) The method as claimed in claim 49, wherein the step of determining the viscosity value comprises the steps of:

determining from the at least one sensor signal and from the excitation current a damping of deflections of the flow tube, and

correcting the determined damping of deflections of the flow tube by using the correction value.

51. (Previously Presented) The method as claimed in claim 47, wherein the step of feeding the excitation arrangement by the excitation current comprises the step of adjusting the excitation frequency to be equal to said mechanical resonance frequency of the flow tube.

52. (Previously Presented) The method as claimed in claim 36, wherein the step of sensing oscillations of said flow tube comprises the step of sensing an inlet-side lateral deflection of the flow tube.

53. (Previously Presented) The method as claimed in claim 36, wherein the step of sensing oscillations of said flow tube comprises the step of sensing an outlet-side lateral deflection of the flow tube.

54. (Previously Presented) The method as claimed in claim 36, wherein the step of determining said viscosity value comprises the step of deriving from the at least one sensor signal a signal value representative of a lateral deflection of the flow tube.

55. (Previously presented) The vibration meter as claimed in claim 20 wherein the evaluating circuit determines the viscosity value by using a magnitude of the excitation current.

56. (Previously presented) The vibration meter as claimed in claim 20 wherein the evaluating circuit determines the viscosity value by using a measured value which represents the excitation current.

57. (Previously Presented) The vibration meter as claimed in claim 28 wherein the flow tube is a straight flow tube.

58. (Previously Presented) The vibration meter as claimed in claim 28 wherein a support frame is clamped to the flow tube, said support frame is enclosed by a housing.

59. (Previously Presented) A vibration meter for measuring a viscosity of a fluid flowing through a pipe, which vibration meter comprises:

a transducer assembly

with at least one flow tube being inserted into the pipe, said flow tube having a lumen conducting the fluid and said flow tube being clamped at an inlet end and an outlet end so as to be capable of vibrating,

with an electromechanical excitation arrangement acting on said flow tube approximately midway between said inlet end and said outlet end, said excitation

arrangement driving said flow tube to oscillate in a bending mode at least partially for producing viscous friction within the fluid, and

with a sensor arrangement, responsive to oscillations of the flow tube within said bending mode, for generating at least a one sensor signal, representative of oscillations of the flow tube oscillating at least partially in said bending mode; and

meter electronics

with an excitation circuit which generates an excitation current feeding the excitation arrangement, and

with an evaluating circuit which derives from said at least one sensor signal and from the excitation current a viscosity value representative of the viscosity of the fluid.

60. (Previously Presented) The vibration meter as claimed in claim 59 wherein the evaluating circuit derives from the at least one sensor signal a density value representative of a density of the fluid and wherein the evaluating circuit also uses said density value for determining the viscosity value.

61. (Previously Presented) The vibration meter as claimed in claim 59 wherein the evaluating circuit derives from the at least one sensor signal a signal value representative of a lateral deflection of the flow tube and wherein the evaluating circuit uses said signal value representative of a lateral deflection of the flow tube for determining the viscosity value.

62. (Previously Presented) The vibration meter as claimed in claim 59 wherein the evaluating circuit determines a damping of said deflections of the flow tube by using the at least one sensor signal and the excitation current and wherein the evaluating determines the viscosity value depending on said damping of the deflections of the flow tube.

63. (Previously Presented) The vibration meter as claimed in claim 59 wherein the evaluating circuit estimates a velocity of a motion of the fluid, said motion causing a viscous friction within said fluid, and wherein the evaluating circuit uses the at least one sensor signal for estimating said velocity.

64. (Previously Presented) The vibration meter as claimed in claim 63 wherein the evaluating determines the viscosity value depending on said motion being estimated.

65. (Previously Presented) The vibration meter as claimed in claim 59 wherein the at least one sensor signal is a first sensor signal generated by said sensor arrangement and wherein the sensor arrangement generates a second sensor signal being representative of outlet-side deflections of said flow tube.

66. (Previously Presented) The vibration meter as claimed in claim 59 wherein the excitation arrangement driving said flow tube to oscillate in a torsional mode simultaneously with said bending mode oscillations.

67. (Previously presented) The vibration meter as claimed in claim 59 wherein the excitation arrangement being fixed to said at least one flow tube.